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Changes to Worship and Perceptions of the COVID-19 Pandemic by Religion in the US

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Master of Public Health

Epidemiology of Microbial Diseases

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Class of 2021

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Abstract

COVID-19 is a recently emerging infectious disease that spreads easily through respiratory droplets and can cause severe illness and death. Individuals can be both infectious and asymptomatic, which makes it difficult to identify those who are at-risk of spreading the disease to others. In the US, shortly after the World Health Organization (WHO) declared COVID-19 a pandemic disease, states began to issue lockdown orders encouraging residents to stay inside to reduce the spread of the virus. As a result, many Americans were not able to attend religious gatherings or worship services for several months. A cross-sectional study surveyed religious Americans in January and February 2021 to determine how worship has changed during the pandemic and how perceptions of COVID-19 vary by religion. There is a significant difference in how often Americans are attending worship services one year into the pandemic compared to how often they were attending before ($p < 0.0001$). Of the respondents whose houses of worship have reopened for modified in-person services, two-thirds (66.5%) believe that the precautions that have been put in place are enough to keep them protected from COVID-19. Men were significantly more willing to get vaccinated than women ($p = 0.006$), and Non-Protestant Christians indicated that their willingness to get the COVID-19 vaccine would decrease significantly if a religious leader spoke out against it ($p < 0.0001$). This thesis is intended for state and local leaders to reference while trying to create safety protocols for religious organizations in future respiratory pandemics.

Keywords: COVID-19, pandemic, religion, worship, faith, perceptions, transmission risk, vaccines, epidemiology of microbial diseases

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Introduction

Religious activity is a cornerstone of American culture. While the number of Americans without a religious affiliation has been increasing over the past few decades, a Pew Research Center report published in 2019 found that 74% of Americans identify as religious. The majority identify as Christian or Jewish, while a growing number identify as Muslim, Buddhist, or Hindu.¹ More than half of adults living in the United States say that religion is a very important part of their lives, and two thirds attend religious worship services at least once a month. Christian and Jewish Americans are the most likely to belong to a local congregation or house of worship, with 64% of Christian Americans reporting membership at a church and 53% of Jewish Americans reporting membership at a synagogue.²

Towards the end of 2019, a newly emerging coronavirus, SARS-CoV-2, was first isolated. The virus – which causes the disease COVID-19 – quickly spread across the globe. COVID-19 is a respiratory disease that is spread through aerosol droplets. Symptoms can appear up to 14 days after exposure and include fever, coughing, shortness of breath, and loss of smell and taste. Not everyone who becomes infected with SARS-CoV-2 will develop symptoms of COVID-19, so it can be difficult to identify people who are infectious and at risk of spreading the virus to others.³

By early March 2020, 118,000 cases had been identified in more than 100 countries, and the World Health Organization (WHO) declared that COVID-19 had become a pandemic disease.⁴ Cities around the world began issuing orders asking that residents stay at home to mitigate spread of the virus. In the United States, California governor Gavin Newsom became the first to issue an order asking all residents to remain inside their homes unless running essential errands. By March 23, less than two weeks after the WHO's declaration, nine other states and the Navajo Nation had followed suit. A month later, 95.4% of Americans were under stay-at-home orders. Five states – Arkansas, Iowa, North Dakota, South Dakota, and Nebraska – did not issue any lockdown orders, while an additional three states –

Wyoming, Utah, and Oklahoma – allowed cities and counties to issue local orders, but never issued a state-wide lockdown order.⁵

The Religious Freedom Restoration Act of 1993 (RFRA) states that the Free Exercise Clause in the First Amendment⁶ prevents the government from requiring religious organizations to make any changes to their worship practices, even if the policies are content neutral and do not specifically target faith groups. Exceptions can be made if a policy advances a government interest – like public health – and is proven to be the least restrictive means of achieving that interest.⁷ In 1997, the RFRA was amended to allow individual states the ability to impose regulations on faith groups, but some state governments have since passed religious freedom acts that mimic the federal RFRA.⁸ The Centers for Disease Control and Prevention (CDC) and other public health organizations can publish guidelines⁹ with recommendations for religious organizations, but it is the responsibility of individual organizations to adopt and enforce these changes. Despite the inability of the federal government to enforce lockdown restrictions on faith groups, houses of worship in most states closed their doors until it became safe to attend in-person gatherings again.¹⁰ International travel restrictions also meant that thousands of faithful worshippers could not leave the US to participate in traditional pilgrimages and religious festivals, such as the Islamic Hajj or Hindu Kumbh Mela.¹¹ Some religious organizations with central leadership, such as the Church of Jesus Christ of Latter-day Saints, cancelled all public gatherings of members regardless of local lockdown policies,¹² and the Catholic archdioceses in many major American cities canceled in-person worship services and moved Catholic school students to online classes.¹³

However, not every religious organization was receptive to the advice of public health officials. One Christian church in Louisiana hosted a service with nearly 2,000 attendees after the state issued stay-at-home orders. The pastor claimed his position as a religious leader made him a first responder and gave him the ability to heal the members of his parish that were affected by COVID-19.¹⁴ The Hasidic Jewish community in New York City experienced outbreaks following multiple wedding ceremonies

with hundreds of guests in attendance, just weeks after the city's mayor limited gatherings to 50 people.¹⁵ And a two-day revival event hosted by multiple Christian congregations in Kentucky was held against the advice of the governor and resulted in at least 30 cases and two deaths across the state. Several of the cases linked to the outbreak had not attended the event.¹⁶

Worship during the pandemic looked different for almost every American, even if their religious organization never cancelled in-person services. Many attended services online or made changes to their practices that allowed them to worship safely. The extent of these changes and American's perceptions of these changes has not been studied. This thesis seeks to understand how COVID-19 changed worship in the US. The first objective is to determine how religious worship changed during stay-at-home orders. The second is to determine if perceptions of the pandemic and newly developed vaccines differed by religion. We hypothesize that Americans are attending in-person religious gatherings less often than they did before the pandemic and that Americans living in predominantly Republican states are attending more often than those living in predominantly Democratic states and have implemented fewer safety precautions to their in-person services. We also hypothesize that perceptions of the pandemic and vaccines will vary significantly by religious affiliation. The results of this thesis are intended to assist state and local political and community leaders in guiding lockdown orders for future respiratory pandemics, especially when it becomes necessary to temporarily suspend religious gatherings.

Background

At this time, very little research has been peer reviewed and published at the intersection of religion and COVID-19. In June 2020, the first paper on virtual church services during the pandemic was published and discussed the movement of many church groups from in-person gatherings to meeting online. The authors mentioned that church attendance is a central part of worship for most Christians, as well as members of other religions. They explored the methods various churches in the

United Kingdom used to move their services online and some of the motivation to stop in-person worship, but they did not discuss parishioner's attitudes towards the switch. Additionally, they did not explore the reopening of churches as many had not resumed in-person services at the time of publication. In March 2020, the Church of England developed a guide to hosting religious services online, and on Easter Sunday, more than 3,000 worship services were livestreamed. Some religious leaders hosted services in their personal homes when they could not lead them in their houses of worship. Many acceptable options for safe worship made it easy for local leaders to choose what would work best to meet their congregation's needs.¹⁷

Another study explored whether cities with higher levels of religiosity were more or less likely to follow general stay-at-home orders. The authors measured religiosity by comparing the number of religious congregations per 10,000 residents in all US cities with a population over one million. Pollution levels over the course of March 2020 were compared to see if there were less vehicle emissions after shelter-in-place orders were issued in order to determine if residents were actually staying at home. There were two contradicting predictions: 1) that religious individuals are more apt to follow the instruction of authority figures and would therefore be more likely to stay at home, or 2) that religious individuals feel that they are supported and protected by a divine power and therefore are less likely to adhere to protective public health recommendations. This study determined that cities with a higher rate of congregations per capita were less likely to follow shelter-in-place orders than cities with a lower religiosity.¹⁸

One qualitative study interviewed twelve clergymen from different churches and different sects of Christianity across Poland. The Catholic and Orthodox churches in Poland were offering limited services at the end of March 2020, and the Protestant churches had completely suspended in-person gatherings.¹⁹ A similar study was conducted in New Zealand, where the researchers interviewed participants at different stages of lockdown. The New Zealand study included Christian participants, as

well as participants from other religions, such as Judaism and Buddhism. It found that some religious leaders were open to making changes to worship: they installed hand sanitizing stations, moved services to Zoom, celebrated holidays at home, and adapted practices that involved shared contact with worship materials. Other leaders were resistant to changes before the government officially issued lockdown orders but were accepting of them after country-wide shutdowns were put in place.²⁰

A handful of publications have also been released regarding religious organizations and perceptions of COVID-19. One publication from the beginning of the pandemic provided examples of faith groups around the world that used their status as protected establishments to host worship services after local governments issued mass gathering bans and stay-at-home orders. The authors acknowledged that there have always been groups who are extreme in their beliefs and routinely defy advice given by public health officials, but most faith groups follow guidelines set by public health officials, modify their worship practices, and assist their members by providing financial assistance and sharing accurate information about the spread of disease.²¹ Later in 2020, a series of fifteen essays was published by a group of religious ethicists about the cultural, ethical, and political implications of COVID-19. The essays touched on a variety of issues, and several focused on the importance of societal interdependence in ending the epidemic. Many organized religions teach the importance of working together and being part of something bigger than oneself, and these teachings can be applied to public health efforts and COVID-19 control.²²

Since COVID-19 is an emerging disease, there are currently few peer-reviewed publications regarding the public's perceptions of the newly developed vaccines. However, one recently published study explored American's perceptions of healthcare advice given by religious leaders. The authors were looking specifically at how to increase human papillomavirus vaccination rates in an Episcopal church in Atlanta, and determined that since religious leaders hold the trust of the congregation they serve, church-based interventions are a vital part of vaccine promotion and general health education.²³

Methods

A cross-sectional study design was used, as the main research objectives are descriptive and seek to determine correlation between religious affiliation, changes to worship practices, and perceptions of COVID-19. The study protocol, survey, and recruitment materials were approved by the Yale IRB under exemption 45 CFR 46.104(d)(2), and the information provided by the participants was collected in such a manner that their identity cannot be readily discovered. Yale University IRB# 2000029683.

Data collection took place through an anonymous survey conducted in January and February 2021. The survey was designed in Qualtrics and distributed through social media platforms – primarily Facebook, Twitter, and Reddit – as well as through the Yale Divinity School student and alumni email listservs. The survey received 328 responses. Responses were excluded from analysis if they did not provide enough data to answer the research questions. 309 responses were included in the final sample. Statistical analysis was conducted using SAS.

To explore the first hypothesis and determine how religious worship in the US changed during the pandemic, the survey asked respondents how frequently they attended religious gatherings and worship services before COVID-19 lockdowns and after their house of worship was allowed to reopen, as well as how frequently they attended virtual services during the closure. The survey also asked questions about the types of services attended. Finally, the changes that have been made to religious services and houses of worship were explored to evaluate how religious worship physically changed to keep parishioners safe after reopening.

To explore the second hypothesis and determine how perceptions of COVID-19 vary between groups, the survey asked respondents about their perceived risk of contracting the virus in various locations. Respondents who reported that their house of worship had reopened for in-person services were asked how safe they felt attending these services. The survey also asked respondents about their

willingness to get the COVID-19 vaccine when it became available to them, and if their willingness would change if the vaccine was endorsed or criticized by a religious leader from their faith group.

The questions used in the survey can be easily divided into two subgroups: questions about the impact of the pandemic on worship practices and questions about perception of COVID-19 vaccines and transmission risk. The worship questions were dichotomous or multiple choice and asked about the type of worship services attended and frequency of attendance. Most of the questions in this subgroup were analyzed using chi-square or Fisher's exact tests; others were not analyzed statistically and are presented here descriptively.

The perception questions were measured using a 5-point Likert scale ranging from "Definitely Yes" to "Definitely No" or from "Extremely Likely" to "Extremely Unlikely" depending on the question block. A number value was assigned to each point on the Likert scale, and the mean was calculated for the total population and each stratified group (religion, age, gender, level of religiosity, and state political affiliation). An Analysis of Means was then conducted to determine if the response for any stratified group varied significantly from the total population. One block of perception questions asked respondents to indicate how likely they thought they were to contract COVID-19 at ten different locations, including houses of worship, schools, gyms, restaurants, large and small social events, hospitals, and grocery stores. This was done to determine if respondents felt safer in their house of worship than they did in non-religious settings with similar exposure risks.

As mentioned previously, the analysis was stratified based on religion, age, gender, level of religiosity, and state political leaning. In the demographics block of the survey, respondents were prompted to indicate their religious affiliation from a dropdown menu of options which were coded into four sub-categories: Protestant Christian, Non-Protestant Christian, Jewish, and Other. The Non-Protestant Christian category was comprised of members of the Catholic Church and the Church of Jesus Christ of Latter-day Saints. The Other category included respondents who did not fit into the other

three categories, as well as those who did not indicate their religious affiliation. Age, gender, race and ethnicity, and location were also collected in the demographics block. Age was broken down into ten-year ranges for respondents to choose from. For both the gender and the race/ethnicity question, respondents had the option to self-describe by selecting “Other” and using the Text Entry to specify their identity. One respondent indicated their gender identity as non-binary, and since they were the only respondent who did not identify as male or female, they were not included in the analysis when stratified by gender but were included in the rest of the analysis. Race and ethnicity were not evaluated as strata as many respondents used the Text Entry option to indicate that their ethnic identity overlapped with their religious identity. Respondents selected which state they lived in using a dropdown menu, and their state’s political leaning was assigned based on the electoral college results of the 2020 presidential election.²⁴ State political affiliation was used instead of geographic region (ie Northeast and Midwest) because COVID-19 lockdowns were issued at the level of individual states. Religiosity was determined from a question asking respondents to report if they considered themselves very, moderately, slightly, or not at all religious.

Results

Changes to Religious Worship

The majority of survey respondents (69.3%) identified as female, while just under a third identified as male. The largest age range (28.6%) was 25-34 years old. The next largest age range was 18-24 (21.4%), followed by 45-54 (19.7%). Over half (56.8%) of the respondents self-identified their level of religiosity as “very religious” and just over one-third (37.0%) identified as “moderately religious.” The survey received responses from 44 states and Washington DC, and there were a similar number of respondents from Republican and Democratic leaning states. More than half (54.7%) of the survey respondents were Protestant Christian. The next largest religious affiliation (24.6%) was Non-

Protestant Christians (Catholics and Latter-day Saints), followed by Judaism (8.1%). 12.6% of survey respondents identified as part of another religious group or did not indicate their affiliation.

Table 1. Characteristics of survey respondents, by religious affiliation

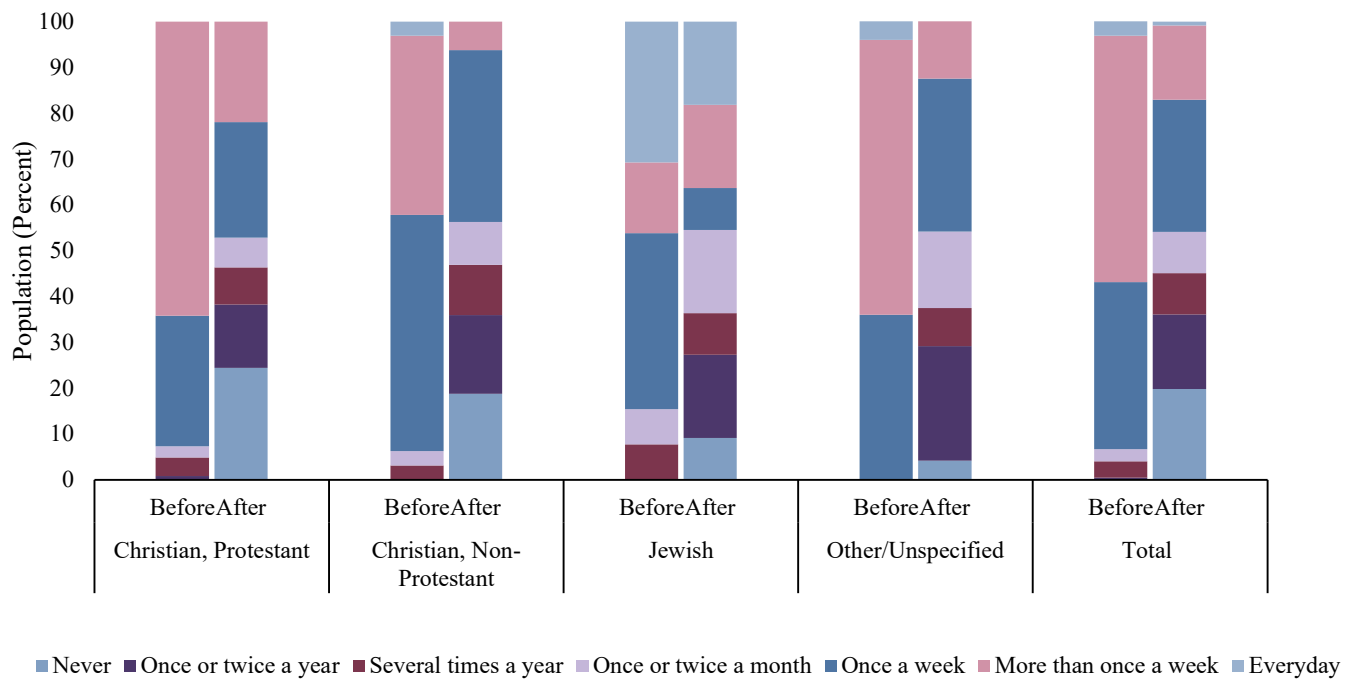
Characteristic	Christian, Protestant		Christian, Non-Protestant		Jewish		Other/ Unspecified		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender										
Male	45	26.6	21	27.6	16	64.0	12	30.8	94	30.4
Female	124	73.4	55	72.4	8	32.0	27	69.2	214	69.3
Non-binary	0	0	0	0	1	4.0	0	0	1	0.3
Age										
18-24	29	17.3	15	19.7	7	28.0	15	38.5	66	21.4
25-34	45	26.8	22	28.9	11	44.0	10	25.6	88	28.6
35-44	25	14.9	4	5.3	3	12.0	5	12.8	37	12.0
45-54	19	17.3	25	32.9	3	12.0	4	10.3	61	19.7
55-64	20	11.9	9	11.8	1	4.0	3	7.7	33	10.7
65+	20	11.9	1	1.3	0	0	2	5.1	23	7.5
Level of Religiosity										
Very religious	107	63.3	43	56.6	5	20.0	20	52.6	175	56.8
Moderately	55	32.5	29	38.2	16	64.0	14	36.8	114	37.0
Slightly	6	3.6	4	5.3	4	16.0	2	5.3	16	5.2
Not at all	1	0.6	0	0	0	0	2	5.3	3	1.0
State Political Leaning										
Republican	90	53.6	45	60.8	8	32.0	16	44.4	159	52.5
Democratic	78	46.4	29	39.2	17	68.0	20	55.6	144	47.5
Total	169	54.7	76	24.6	25	8.1	39	12.6	309	100

*numbers may not sum to total based on missing variables

A chi-squared test shows a significant difference ($p < 0.0001$) between how often Americans attended worship services and religious gatherings before the pandemic compared with how often they attended services after their house of worship was allowed to reopen. 86.0% of survey respondents

attended worship services once a week or more before COVID-19 lockdown orders, compared to 45.5% who attended at least once a week after their house of worship reopened for in-person services. Of the 72.8% (n=225) who indicated that their house of worship had reopened, 14.1% said they have not attended any services and another 18.5% have only attended once or twice since the reopening.

Figure 1. Frequency of attendance at worship services before the COVID-19 pandemic and after in-person services resumed, by religious affiliation



Survey respondents were asked if their religious organization or faith group cancelled traditional in-person gatherings for any part of 2020. In-person services were not cancelled at all during the pandemic for 12 (3.9%) of the survey respondents.

Before the pandemic, sermons and weekly services were the most frequently attended type of worship service for people of all religious backgrounds, and it remains the most frequently attended for those who have been able to return to in-person worship activities. The biggest decreases in attendance were seen in service opportunities and group meals, followed closely by small group activities.

Table 2. Change in the type of religious gatherings and worship services attended before the pandemic and after house of worship reopened

Type of Gathering	Before Closing		After Reopening		Change in Percent
	n	%*	n	%*	
Sermon/Weekly Service	210	93.3	161	85.2	↓ 8.1
Group Prayer	75	33.3	33	17.5	↓ 15.8
Formal Scripture Study (lead by a religious leader)	91	40.4	45	23.8	↓ 16.6
Informal Scripture Study (not lead by a religious leader)	87	38.7	24	12.7	↓ 26.0
Non-religious social activity organized by faith group	98	43.6	15	7.9	↓ 35.7
Small group activity	146	64.9	50	26.5	↓ 38.4
Group Meal	105	46.7	13	6.9	↓ 39.8
Service opportunity organized by faith group	110	48.9	15	7.9	↓ 41.0

*percent of respondents that reported that their religious organization has reopened for in-person services (n=225)

Respondents were also asked about online services, and 90.9% indicated that their religious organization began offering virtual or online services during the pandemic that they had not offered previously. All 25 (8.1%) of the respondents who indicated that their faith group had offered virtual services before the pandemic indicated that their in-person services were also cancelled, and 23 of them indicated that their organization expanded the selection of virtual offerings in 2020 to include services that had not been offered previously. There was no significant difference between religions in the decision to offer virtual worship services (p=0.35).

The majority of respondents (77.9%, n=225) indicated that their house of worship was open at the time of the survey. Respondents living in predominantly Republican states were significantly more likely to belong to houses of worship that had reopened for in-person services than respondents in predominantly Democratic states (55.8% vs 43.2%, p=0.022) and Non-Protestant Christian groups were significantly more likely to have reopened their house of worship for in-person services than groups of other religious affiliation (p=0.024).

Table 3. Changes made to services and houses of worship to prevent the spread of COVID-19

Change to In-Person Worship Services	n	%*
Promotion of social distancing	199	91.7
Reduced/limited capacity	171	79.9
Modification of worship involving physical contact (i.e. handshaking or foot washing)	168	77.4
Mask wearing required for the entire service	159	73.3
Increased frequency of cleaning	153	71.5
Removal of shared worship devices (i.e. prayer mats or hymnals)	126	58.1
Use of ropes or tape on chairs and pews to encourage social distancing	126	56.3
Modified use of shared worship devices	103	47.5
Shortened services	99	45.6
Posting of educational signs on how to prevent COVID-19 transmission	96	44.9
Removal of chairs or pews to encourage social distancing	85	39.7
Use of tape or other markers on floors to encourage social distancing	57	26.6
Services held outdoors	55	25.4
Mask wearing required for parts of the service	51	23.5
Increased ventilation	30	14.0
Closing of restrooms	29	13.6
Temperature checks upon entry	26	11.9
No changes have been made to services	4	1.9
No changes have been made to house of worship	2	0.9

*percent of total respondents that reported that their religious organization has reopened for in-person services (n=225)

66.5% of respondents whose houses of worship have reopened believed the changes that had been made to their in-person services were enough to keep the members of their religious organization protected against the spread of COVID-19. There was no significant difference in this perception between religion, political affiliation, age, gender, or level of religiosity.

Perception of COVID-19 Transmission Risk

The respondent's perceived risk of contracting COVID-19 in various non-religious settings was evaluated to determine how they differed from perceptions of risk in houses of worship. Two thirds of

respondents (67.9%) perceived their likelihood of contracting COVID-19 at gyms or fitness centers as somewhat or extremely likely, but only 3.15% said the same about public parks and trails. The risk of catching COVID-19 at a grocery store was perceived as less than the risk at most other locations, with 36.2% of the total population indicating that they felt somewhat or extremely likely to catch the virus while buying food. The survey respondents perceived higher risk of contracting COVID-19 at restaurants with indoor dining, with two-thirds (65.8%) of the total population indicating they felt somewhat or extremely likely to catch the virus while eating out.

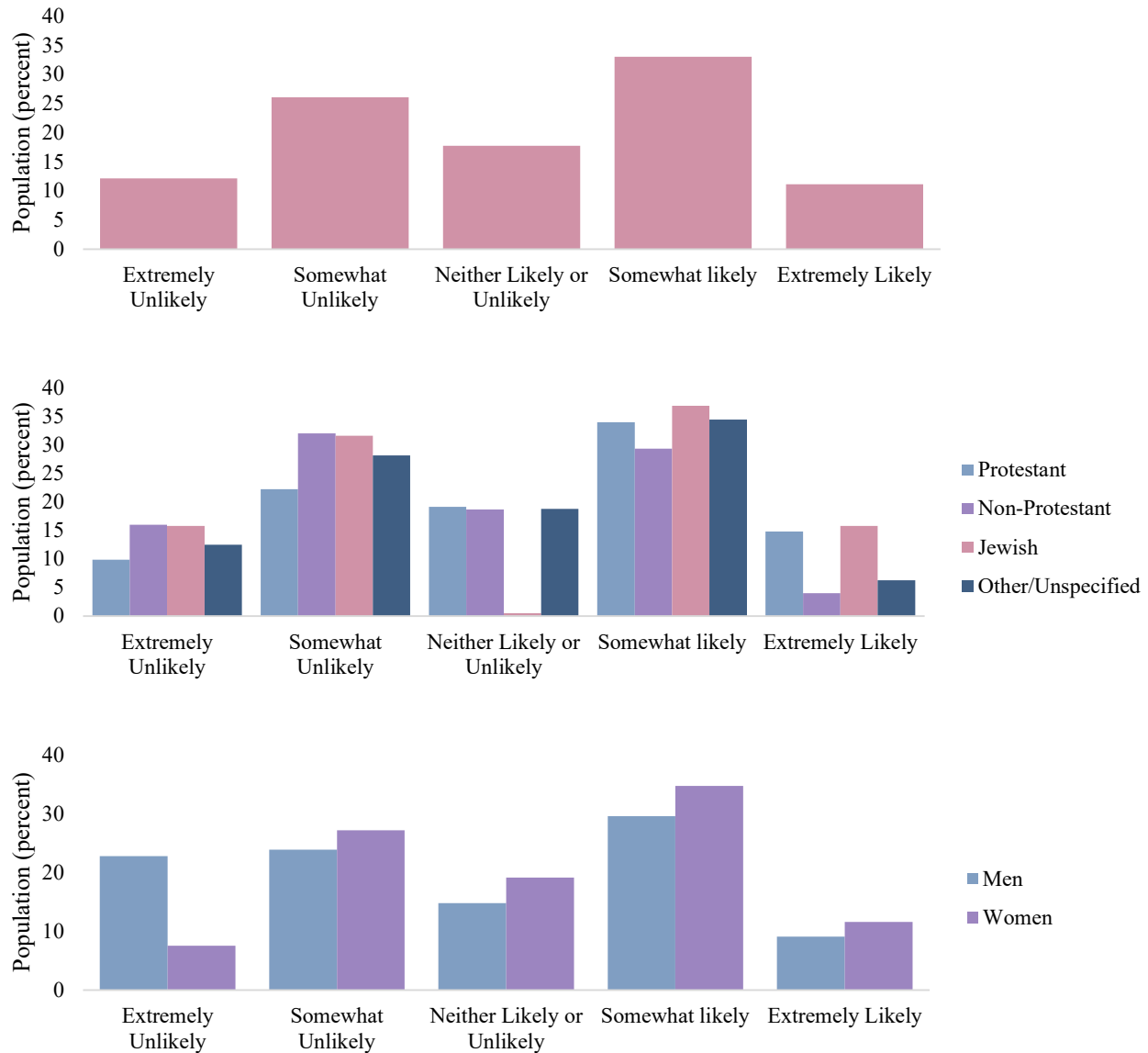
Half of the survey respondents (50.1%) indicated that they felt somewhat or extremely likely to contract COVID-19 at school or work. Similarly, 52.1% of respondents indicated that they were somewhat or extremely at risk of getting the virus at social gatherings with less than ten people in attendance. Social events with 10 or more people had the highest perceived risk of contracting COVID-19, with 81.5% of respondents indicating that they considered their risk in this setting to be extremely or somewhat likely.

There were significant differences in how different groups perceived their risk of contracting COVID-19 at houses of worship. Less than half of the total respondents (44.3%) said that they were somewhat or extremely likely to get the virus in a religious setting. This finding varied significantly by gender ($p=0.018$), with 38.5% of men and 46.2% of women perceiving their risk of COVID-19 at houses of worship as somewhat or extremely likely.

Perception of COVID-19 risk in houses of worship also varied significantly by religion. An analysis of means indicated that Protestant Christians perceived a significantly higher risk ($p=0.032$) of contracting COVID-19 at a house of worship, and Non-Protestant Christians perceived a significantly lower risk ($p=0.036$). Almost half of Protestant Christians (48.8%) and a third of Non-Protestant Christians (33.3%) said they were somewhat or extremely likely to get the virus in their house of worship. Perceptions of risk from respondents who were not Christian were not significantly different

from that of the total population, and perceptions did not vary significantly by age ($p=0.14$) or level of religiosity ($p=0.34$).

Figure 2. Perceived risk of contracting COVID-19 at a house of worship, stratified by religious affiliation and gender



Perception of COVID-19 risk in houses of worship also did not vary significantly by the political affiliation of the state they currently live in ($p=0.16$); however, respondents living in Democratic leaning states were more likely to indicate that being an active member of their faith group will protect them

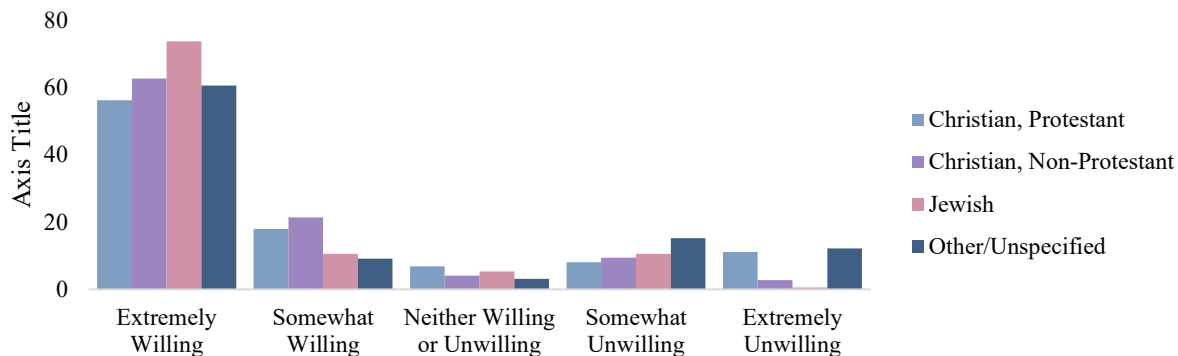
against COVID-19 ($p=0.0012$). The belief that being an active member of a faith group will protect an individual against COVID-19 did not vary significantly by any other variables.

Perception of COVID-19 Vaccines

Survey respondents were asked to indicate their willingness to get the COVID-19 vaccine. Like the questions about risk perception, respondents were asked to indicate their feelings about the vaccine on a 5-point Likert scale, and their answers were given numerical value then compared to the total population using analysis of means.

The respondents had a positive reaction to the vaccine, with 76.8% indicating that they were willing to get the vaccine when it became available to them. Men were significantly more willing to get the vaccine than women ($p=0.006$), with 84.1% of male respondents and 73.5% of female respondents indicating that they would get vaccinated.

Figure 3. Willingness to get COVID-19 vaccine, stratified by religious affiliation



In the total population, 16.7% said their willingness would increase if vaccination was encouraged by a religious leader and 6.2% said their willingness would decrease if it was discouraged. Protestant Christians indicated that their willingness was significantly less likely to be influenced by a religious leader who encouraged ($p=0.015$) or discouraged the vaccine ($p=0.0003$), while Non-Protestant Christians were significantly less likely to get it if a religious leader spoke against it ($p<0.0001$). Of the

respondents who identified as Non-Protestant Christians, 84% said they were willing to get the vaccine when it became available to them, 24% said their willingness would increase if the vaccine was endorsed by a religious leader, and 16% said it would decrease if a religious leader advised them not to get vaccinated. There was no significant difference in the willingness of respondents who were not Christian to get vaccinated if the vaccine was endorsed or discouraged by a religious leader.

Discussion

It is impossible to deny that the COVID-19 pandemic has impacted every aspect of American culture. And as one of the cornerstones of American culture, religious worship has been severely impacted as well. Americans are attending fewer in-person worship services than they were before the pandemic brought stay-at-home orders that closed doors across the country, and the services they are attending look very different than they did before. By understanding how worship changed, as well as how perceptions of COVID-19 risk and the vaccine varied by religious affiliation, public health officials and community leaders will be better prepared to create guidelines to keep Americans safe during future pandemics.

As schools and offices switched to remote learning and working from home, religious organizations across the country also moved online. Many houses of worship offered new virtual services they had not offered previously, which meant that congregants could still gather and worship together even though they could not physically be in the same place. There was no significant difference between religious groups in the decision to cancel in-person services, so local community and political leaders should not be apprehensive about any religious organization being more likely to hold services during future lockdown orders. There was also no significant difference in the decision to cancel in-person services between predominantly Republican or Democratic states, which suggests that state

politicians and community leaders from all political backgrounds recognize the potential for disease transmission in all locations, and do not necessarily give preferential treatment to houses of worship.

Many Americans have not attended an in-person worship service since March 2020, and those whose houses of worship had reopened at the time of the survey are going to fewer services than before lockdown orders were issued. Because Americans are not going to as many in-person services – if they're even attending them at all – there is less opportunity for the virus to be transmitted at religious activities. This may contribute to the perceived risk of COVID-19 at houses of worship being less than the perceived risk in other settings.

When a lockdown order is issued, houses of worship are often categorized as businesses, along with grocery stores, restaurants, and fitness centers; however, the interactions between individuals at houses of worship more closely compare to interactions at school, work, and other events where large groups of people are indoors and in close proximity to each other for an extended period of time.²⁵ The survey respondents indicated that they felt less likely to get COVID-19 in a house of worship than they did at a gym or restaurant, and they perceived their risk to be about the same in their house of worship and in their school or work. This could be a result of the different safety precautions that have been implemented in these settings, but when making the decision to close houses of worship for future lockdown orders, state and local governments should consider using the same restrictions placed on schools and offices, instead of classifying them as businesses.

Of the survey respondents who have returned to worshipping in-person, nearly all of them report that physical changes have been made to their services and their houses of worship. These changes are intended to allow congregants to gather with each other while keeping them safe from COVID-19. While the CDC's recommendations have not all been adopted by every faith group, it is clear that religious leaders across the US recognize the importance of these guidelines in keeping the members of their faith group protected from the spread of infectious disease.

After determining what policies have been implemented to keep worshipers safe during in-person religious services, it is important to ask congregants what they think of the precautions. If they do not feel that the changes are enough to prevent the spread of COVID-19, they might not attend in-person services. Of the respondents whose houses of worship had reopened for in-person services, two-thirds indicated that they believe any changes made are enough to keep the members of their organization healthy and safe. If worshipers feel safe at in-person gatherings in their house of worship and are asked by their local government to adopt stricter precautions for any reason, they might be resistant to the new precautions. Those who feel protected while worshiping might be open to relaxing precautions sooner than others who do not feel safe in this setting.

The data for this analysis was collected in early 2021 when the Pfizer and Moderna vaccines had just been approved for emergency use²⁶ and were only available to medical professionals and high-risk individuals. Survey respondents indicated strong willingness to get the vaccine when it became available to them, and this willingness did not vary significantly by religious affiliation.

When asked if the decision to get vaccinated would be influenced by a religious leader endorsing or opposing the vaccine, most respondents indicated they were somewhat likely to be influenced positively and not very likely to be discouraged. Non-Protestant Christians were significantly more likely than the rest of the population to have their willingness influenced negatively by an authority figure from their faith group. A distinction was not made in the survey to determine if there was a difference in the influence of local leadership – such as Catholic Archbishops and Latter-day Saint Seventies – compared with the influence of a more central authority – such as the pope or prophet. Both the local leaders and central authorities in these religious groups have a significant influence over the health behaviors of others in their organization, and should make efforts to become educated on issues relating to COVID-19 transmission and vaccination, since they are capable of making a substantial impact on the disease incidence and vaccination rates among their members.

Limitations

Because of the cross-sectional study design, causation cannot be determined from the data, only correlation. There was a stark difference in how Protestant and Non-Protestant Christians perceived their risk of contracting COVID-19 in houses of worship, but this difference may be a result of safety precautions that have already been implemented, and not a result of respondents believing that their faith will protect them from harm.

As the survey was distributed through social media and other internet sources, there is risk of sampling bias, which makes it difficult to determine its generalizability. The respondents were not racially diverse and identified almost exclusively as Christian or Jewish. This study can be repeated in the future with a larger sample size, more racial diversity, and a greater number of religions represented. Disproportionate sampling should be used to ensure that there are enough respondents from each major religion to allow for statistical analysis. Another limitation is that political affiliation for each respondent was broadly assumed based on their state's electoral college votes from the 2020 presidential election. Future studies should consider asking for each respondent's personal political affiliation, which will create more accurate strata for analysis.

Future Research

People from all backgrounds will turn to religion for comfort during times of crisis or after a traumatic event. The Great Depression, World War II, and September 11 were all followed by a short-lived increase in attendance at worship services.²⁷ In January 2021, the Pew Research Center reported that more than a quarter (28%) of American adults say that COVID-19 has made their religious faith stronger.²⁸ The recommendation for further research is to conduct a study after states have reached the last phase of their reopening plans to determine if religious worship has returned to the way it was before the pandemic, if it has decreased due to the continuing decline in religion, or if it has increased as people tend to find comfort in religion after traumatic events.

Conclusion

The results of this thesis support the existing literature on changes to religious worship during the COVID-19 pandemic. Much of the existing literature was based on data gathered from qualitative research such as interviews and focus groups. While many studies had previously explored the motivation for these changes and the resources used to accomplish them, this thesis collected and analyzed quantitative data to better understand the scope of these changes. The results support the studies that discuss how religious leaders influence the healthcare choices of congregants – especially in situations of vaccine hesitancy – and add to the existing literature by speaking specifically to the COVID-19 vaccines and exploring how perception and influence vary by religious affiliation.

This thesis is intended for the use of political and community leaders to inform shutdown policies and reopening guidelines for future respiratory pandemics. While there are limitations on how the government can regulate religious activity in the US, federal and state leaders can provide guidelines to religious organizations to help prevent the spread of disease in their houses of worship. Religious leaders – especially leaders of Non-Protestant Christian groups – have significant influence over members of their faith, and public health professionals should work with them to determine the best way to adapt religious worship during a pandemic or other prolonged national emergency.

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Appendix

COVID-19 and Changes to Religious Worship

Start of Block: Default Question Block

Q1 **Study Title:** How different religious communities in the United States adapted worship services in response to the COVID-19 pandemic

Principal Investigator: Allison Bailey (a.bailey@yale.edu) **Research Study Summary:** We are asking you to join a research study. The purpose of this research study is to learn more about how different faith groups adapted their worship in response to the COVID-19 pandemic. The study will also determine how attitudes towards the pandemic vary between faith groups. Study activities will include: a survey with questions about demographics, attendance at religious gatherings/worship services before and during the COVID-19 pandemic, and your attitude toward the pandemic. Your involvement will require 10-15 minutes of your time. We do not expect any risks from taking part in this study. The survey is completely anonymous. The study may have no benefits to you. The study will be used to understand how religious groups are changing their worship practices to protect their members from COVID-19. The results will help guide adaptations to religious gatherings and worship services for future public health emergencies. Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You also can change your mind at any time. Whatever choice you make will not have any effect on your relationship with Yale University or the Yale School of Public Health. **Are there any costs to participation? Will I be paid for participation?** You will not have to pay for taking part in this study. You will not be paid for taking part in this study. **How will you keep my data safe and private?** All of your responses will be **anonymous**. Only the researchers involved in this study and those responsible for research oversight (such as representatives of the Yale University Human Research Protection Program, the Yale University Institutional Review Boards, and others) will have access to any information that could identify you that you provide. When we publish the results of the research or talk about it in conferences, we will not use any identifying information. We will not share any of your information with other researchers for future research studies, even if we remove all identifiers such as your name. **What if I want to refuse or end participation before the study is over?** Taking part in this study is your choice. You can choose to take part, or you can choose not to take part in this study. You also can change your mind at any time. Whatever choice you make will not have any effect on your relationship with **Yale University**. You do not give up any of your legal rights by giving your agreement to participate. **Who should I contact if I have questions?** Please feel free to ask about anything you don't understand. If you have questions about your rights as a research participant, or you have complaints about this research, you call the Yale Institutional Review Boards at (203) 785-4688 or email hrpp@yale.edu.

Q2 I am 18+ and currently reside in the United States. I have read and agree to the terms above and consent to participate in this study. Please select "I Agree" to continue to the survey

I agree (1)

I do not agree (2)

Skip To: End of Survey If Q2 = I do not agree

End of Block: Default Question Block

Start of Block: Demographics

Q3 What is your age?

18-24 years old (1)

25-34 years old (2)

35-44 years old (3)

45-54 years old (4)

55-64 years old (5)

65-74 years old (6)

Greater than 75 years old (7)

Q4 How do you describe your race or ethnicity? (Select all that apply)

White (1)

Black or African American (2)

Hispanic or Latino (3)

American Indian or Alaska Native (4)

Asian (5)

Native Hawaiian or Pacific Islander (6)

Other (please specify) (7) _____

Q5 What gender do you identify as?

Male (1)

Female (2)

Other (please specify) (3) _____

Q7 Where do you live?

Alabama (1)	Maryland (20)	Oaklahoma (36)
Alaska (2)	Massachusetts (21)	Oregon (37)
Arizona (3)	Michigan (22)	Pennsylvania (38)
Arkansas (4)	Minnesota (23)	Rhode Island (39)
California (5)	Mississippi (24)	South Carolina (40)
Colorado (6)	Missouri (25)	South Dakota (41)
Connecticut (7)	Montana (26)	Tennessee (42)
Delaware (8)	Nebraska (27)	Texas (43)
Florida (9)	Nevada (28)	Utah (44)
Georgia (10)	New Hampshire (29)	Vermont (45)
Hawaii (11)	New Jersey (30)	Virginia (46)
Idaho (12)	New Mexico (31)	Washington (47)
Illinois (13)	New York (32)	West Virginia (48)
Indiana (14)	North Carolina (33)	Wisconsin (49)
Iowa (15)	North Dakota (34)	Wyoming (50)
Kansas (16)	Ohio (35)	Washington DC (51)
Kentucky (17)		
Louisiana (18)		
Maine (19)		

End of Block: Demographics

Start of Block: Religion

Q6 What is your religious affiliation?

Agnostic (1)	Jehovah's Witness (15)
Assemblies of God (2)	Latter-Day Saints (16)
Athiest (3)	Lutheran (17)
Baptist (4)	Methodist (18)
Buddhist (5)	Non-Denominational Christian (19)
Catholic (6)	Pentecostal/Apostolic (20)
Christian Scientist (7)	Presbyterian (21)
Church of Christ (8)	Seventh Day Adventist (22)
Eastern Orthodox (9)	Sikh (23)
Episcopalian (10)	Southern Baptist (24)
Evangelical (11)	Unitarian Universalist (25)
Hindu (12)	United Church of Christ (26)
Islam (13)	Other Christian Religion (27)
Judaism (14)	Other Non-Christian Religion (28)
	I do not have a religious affiliation (29)

Q10 Are you a representative of your religious institution?

Yes, I serve as a board member or in the clergy (1)

I teach others, but do not have leadership responsibilities (2)

My faith community does not have formal leadership (3)

No, I am not a recognized leader (4)

Other (please specify) (5) _____

Q27 How religious do you consider yourself to be?

Very religious (1)

Moderately religious (2)

Slightly Religious (3)

Not religious at all (4)

Q28 Which is more important to you, your religious beliefs or your health?

My religious beliefs (1)

My health (2)

Both are equally important to me (3)

End of Block: Religion

Start of Block: Religious Activities before COVID-19

Q10 Before the COVID-19 pandemic, how frequently did you attend organized religious gatherings or worship services?

- Never (1)
 - Once or twice a year (2)
 - Several times a year (3)
 - Once or twice a month (4)
 - Once a week (5)
 - More than once a week (6)
 - Everyday (7)
-

Q12 Were any of these gatherings or services virtual or online?

- Yes (1)
 - No (2)
-

Q11 What types of religious gatherings or worship services did you attend in-person before the COVID-19 pandemic? (select all that apply)

- Sermons or Weekly Services (1)
- Group Prayers (2)
- Group Meals (3)
- Formal scripture study (lead by a religious leader) (4)
- Informal scripture study (not lead by a religious leader) (5)
- Small group activities (6)
- Service opportunities organized by your faith group (7)
- Non-religious social activities organized by your faith group (8)
- Other (please specify) (9) _____

End of Block: Religious Activities before COVID-19

Start of Block: Religious Activities During COVID-19

Q11 Did your religious organization or faith group cancel traditional in-person gatherings or worship services for any part of 2020?

Yes (1)

No (2)

Q14 Did your religious organization or faith group offer any new virtual or online services in 2020 that they did not offer previously?

Yes (1)

No (2)

End of Block: Religious Activities During COVID-19

Start of Block: Block 9

Display This Question:

If Q11 = Yes

And Q14 = Yes

Q15 How often did you attend virtual or online organized religious gatherings or worship services while your in-person services were cancelled?

Never (1)

Once or twice (2)

Several times (3)

Once or twice a month (4)

Once a week (5)

More than once a week (6)

Every day (7)

Display This Question:

If Q11 = Yes

And Q14 = Yes

Q16 What types of religious gatherings or worship services did you attend virtually while your in-person services were cancelled?

Sermons or Weekly Services (1)

Group Prayers (2)

Group Meals (3)

Formal scripture study (lead by a religious leader) (4)

Informal scripture study (not lead by a religious leader) (5)

Small group activities (6)

Service opportunities organized by your faith group (7)

Non-religious social activities organized by your faith group (8)

Other (please specify) (9) _____

End of Block: Block 9

Start of Block: Reopening

Display This Question:

If Q11 = Yes

Q17 Is your religious organization or faith group currently offering in-person religious gatherings or worship services?

Yes (1)

No (2)

End of Block: Reopening

Start of Block: Block 10

Display This Question:

If Q17 = Yes

Q19 How often have you attended in-person religious gatherings or worship services in the past three months or since services resumed?

- Never (1)
- Once or twice (2)
- Several times (3)
- Once or twice a month (4)
- Once a week (5)
- More than once a week (6)
- Every day (7)

Display This Question:

If Q17 = Yes

Q31 What types of religious gatherings or worship services have you attended in-person in the past three months or since services resumed?

- Sermons or Weekly Services (1)
- Group Prayers (2)
- Group Meals (3)
- Formal scripture study (lead by a religious leader) (4)
- Informal scripture study (not lead by a religious leader) (5)
- Small group activities (6)
- Service opportunities organized by your faith group (7)
- Non-religious social activities organized by your faith group (8)
- Other (please specify) (9) _____

Display This Question:

If Q14 = Yes

Q18 Is your religious organization or faith group still offering virtual or online services?

- Yes (1)
- No (2)

End of Block: Block 10

Start of Block: Changes to Worship Services

Display This Question:

If Q17 = Yes

Q20 Have any changes been made to your in-person worship services? (Select all that apply)

- Modified use of shared worship devices (1)
- Temperature checks upon entry (2)
- Mask wearing required for parts of the service (3)
- Mask wearing required for the entire service (4)
- Modification of worship involving physical contact (such as handshaking or foot washing) (5)
- Removal of shared worship devices (such as prayer mats or hymnbooks) (6)
- Promotion of social distancing (7)
- Shortened services (8)
- Services held outdoors (9)
- Other (please specify) (10) _____
- Other (please specify) (11) _____
- Other (please specify) (12) _____
- No changes have been made (13)

Display This Question:

If Q17 = Yes

Q21 Have any changes been made to your house of worship? (Select all that apply)

- Reduced/limited capacity (1)
- Removal of chairs or pews to encourage social distancing (2)
- Use of ropes or tape on chairs or pews to encourage social distancing (3)
- Use of tape or other marks on floors and walkways to encourage social distancing (4)
- Increased ventilation (5)
- Increased frequency of cleaning (6)
- Closing of restrooms (7)
- Posting of educational signs on prevention of COVID-19 transmission (8)
- Other (please specify) (9) _____
- Other (please specify) (10) _____
- Other (please specify) (11) _____
- No changes have been made (12)

Display This Question:

If Q17 = Yes

Q26 Do you feel that these changes are sufficient to protect the members of your religious group from contracting COVID-19 during worship services?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

End of Block: Changes to Worship Services

Start of Block: Perception of Risk

Q22 In your opinion, how likely are you to contract COVID-19 at the following locations?

	Extremely unlikely (1)	Somewhat unlikely (2)	Neither likely nor unlikely (3)	Somewhat likely (4)	Extremely likely (5)
School or Work (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Gym or Fitness Center (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Grocery Store (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
House of Worship (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Public Park or Trail (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restaurant (Indoor Seating) (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Airport or Train Station (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Doctor's Office or Hospital (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social Event (<10 people) (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Social Event (≥10 people) (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q23 Do you believe that being an active member of your religious organization or faith group will protect you from contracting COVID-19?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

End of Block: Perception of Risk

Start of Block: COVID-19 Vaccine

Q23 Are you willing to take the COVID-19 vaccine when it becomes available to you?

- Extremely willing (1)
- Somewhat willing (2)
- Neither willing nor unwilling (3)
- Somewhat unwilling (4)
- Extremely unwilling (5)

Q24 Would your willingness to take the COVID-19 vaccine increase if it was endorsed by a religious leader from your faith group?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

Q25 Would your willingness to take the COVID-19 vaccine decrease if a religious leader from your faith group advised you not to get it?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

End of Block: COVID-19 Vaccine